

Factors Impacting COVID-19 Data Reporting



Up-to-date information on COVID-19 incidence and mortality provides guidance on public health response to the pandemic. New research from the U.S. has specifically examined periodic fluctuations in new daily cases and mortality data, finding that such "oscillations" are due to many factors such as daily variation in testing and possible biases in data reporting.

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"Our results suggest that when oscillations occur in epidemiological data, this may be a signal that there are shortcomings in the public health system generating that information," wrote authors of the study published in *mSystems* (Bergman A et al. 2020)

When there are periodic highs and lows in epidemiological data, how the health system generates and reports the information may provide the underlying reason. This factor should be considered first before looking at other causes, such as infection cycles and higher incidence rates on certain days, the authors explain.

For this study, the authors analysed trends and periodicity in COVID-19 case incidence and mortality data in the U.S., both in the country as a whole and specifically in two known hotspots – New York City (NYC) and Los Angeles (LA) in California. Instead of performing an auto-correlation analysis, the researchers did a power spectrum analysis on the detrended data, an analytic method not typically applied to infectious disease, they noted.

"We are also careful to identify data sets in which positive tests and deaths are back-dated to the episode date, rather than being dated to the reporting date, in order to control for the effect of reporting," the authors pointed out.

Key findings of the study include:

- Periodic weekly oscillations in the incidence and mortality data for COVID-19. New cases showed a clear peak at the frequency of 0.143, corresponding to a period of 7.0 days, with mortality data also revealing a periodicity of 7.0 days.
- Fluctuations in incidence data showed a very strong correlation with the day-to-day testing numbers, implying that these were directly caused by variation in testing.
- Mortality data oscillations appear to reflect the weekly tempo of reporting, rather than true oscillations in deaths. For instance, there was no weekly periodicity observed in NYC or LA deaths. When normalised to a seven-day moving average, the NYC and LA mortality data show some oscillation but no clear periodicity.

While our analysis did not rule out the existence of societal factors (eg, increased infections on weekends or variations in quality of care), the authors say their findings indicate such factors are immaterial and do not translate to clear signals.

"Periodic oscillations in COVID-19 incidence and mortality data reflect testing and reporting practices and contingencies. Thus, these contingencies should be considered first prior to suggesting biological mechanisms," the authors conclude.

Source: American Society for Microbiology

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